

revenues,<sup>60</sup> a share beyond the high end of this range. Despite the large market share held by the three major carriers, B&W express concern that my

theory of tacit collusion is based on the assertion that there are only three long distance carriers of competitive significance. He ignores LDDS/WorldCom, Frontier, LCI, and others on the grounds that the top three firms are "collusively dominant," but he provides no analysis or other support for this claim. As we have demonstrated, non-Big Three carriers constitute a powerful competitive force that has, in recent years, significantly eroded the collective market share of AT&T, MCI, and Sprint.<sup>61</sup>

50. My position is that the "non-Big Three" carriers do not represent a "powerful competitive force." Unlike AT&T, MCI and Sprint, all except two of these companies lack the network capacity in facilities to provide national interLATA toll services.<sup>62</sup> As such, they face "sunk cost" barriers to expansion that the major facilities-based carriers have overcome. Incremental market share gains by these smaller, facilities-based carriers does not preclude tacit collusion by their larger rivals. As in a price leadership model, maximizing profits by slowly giving up share to fringe firms can be an optimal form of behavior if the initial supra-competitive profits earned exceed the value of losses associated with the resulting market share erosion.<sup>63</sup> Given the share gains by fringe long-distance firms since 1984, about one percentage point per year, it is unlikely that these carriers threaten the margins of the three largest carriers by gains in share.

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<sup>60</sup> See Table One of this affidavit.

<sup>61</sup> Bernheim and Willig 1996 Manuscript, chapter two, p. 46.

<sup>62</sup> The only other facilities-based carrier of note is LDDS WorldCom, with a market share of 4.6 percent as of June 1996. See FCC (September 1996), LONG DISTANCE MARKET SHARES: SECOND QUARTER 1996.

<sup>63</sup> See Stigler, G. (1965), *The Dominant Firm and the Inverted Umbrella*, 8 JOURNAL OF LAW AND ECONOMICS.

51. In fact assuming the opposite results in nonsense. Increases in non-major shares should have resulted in reductions in price-cost margins for the three major carriers. Price-cost margins for AT&T, MCI, and Sprint have risen persistently while their combined share has fallen, the opposite of what would have occurred if the major carriers were being beaten down by Frontier. The non-majors' share has increased because the majors' profit margins have risen. So far the smaller facilities-based carriers have not exerted any observable competitive discipline upon AT&T, MCI, and Sprint.

## 2. *Stable Market Shares*

52. B&W question (1) whether stability of market shares is a condition relevant to collusive behavior; (2) whether such stability has been observed in the long-distance markets; and (3) suggest that market share stability in long distance markets is more consistent with competition than collusion. First, B&W dispute whether stable market shares are best thought of as "a structural condition of a market that might lead to collusion" or a possible consequence of collusion.<sup>64</sup> In the context of a process by which the major carriers arrive at their collusive arrangement gradually, stable market shares are the means for arriving at market conduct leading to collusion. Specifically, when market shares greatly differ among firms, and change rapidly, so that one or two firms are much larger than the rest, it is likely that individual share behavior cannot be collectively regulated. But as market shares become more equal, and each firm's share can be identified, then the dominant firm's threat to cut prices to halt its loss of customers becomes a profitable strategy. Furthermore, as small firms grow and they earn higher profits, the dominant firm is able to more credibly threaten them with less profitable, low prices of the others do not support tacitly collusive outcomes.

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<sup>64</sup> Bernheim and Willig 1996 Manuscript, chapter two, p. 46.

53. Second, B&W suggest that "it is readily apparent that long distance is not conducive to the collusive stability of market shares. This is because long distance carriers have no natural way to divide the market; they cannot avoid competing for each others' customers."<sup>65</sup> But in fact, stability of market shares has been achieved in the 1990s and each carrier has learned to manage "churn" in its customer base so that shares stay the same.

54. Third, B&W state that "MacAvoy is simply wrong as a matter of historical fact . . . substantial erosion of AT&T's market share has continued to the present day. AT&T's recent losses appear small only in comparison to the enormous changes that took place between 1984 and 1989."<sup>66</sup> In 1984, AT&T had more than 90 percent of interLATA toll revenues, while MCI and Sprint had five and three percent, respectively. Over the period from 1984 to 1989, AT&T's share decreased by 20 percentage points, and MCI and Sprint's shares increased by eight and six percentage points, respectively. Subsequently, from 1990 through 1992, the rate of change in AT&T's share diminished, with it losing only three percentage points to MCI and none to Sprint. AT&T then continued to lose up to three percentage points per year in toll total revenue share from 1993 to 1995. MCI and Sprint, however, were not the recipients of these losses. Rather, numerous extremely small facilities-based providers and service resellers gained share of long-distance services, moving from seven percent in 1993 to 13 percent in 1995, while Sprint and MCI's share each remained the same throughout this three year period. There is no controversy over these changes in shares but rather in their interpretation. I hold the position that shares within the largest three carriers have stabilized in the 1990s, and that the net losses to the non-majors is of limited consequence for setting price-cost margins.

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<sup>65</sup> *Id.*, p. 47.

<sup>66</sup> *Id.*, p. 46.

### 3. *Homogeneous Services*

55. B&W claim that the “link between homogeneity and collusion is tenuous,”<sup>67</sup> but this view is not generally held. Most texts that address this issue state that collusion is easier to achieve in markets with homogeneous goods.<sup>68</sup> Specifically, it is easier for firms to agree upon a price if each is supplying essentially the same set of products. Reaching and monitoring pricing agreements becomes more difficult when a complex pricing structure is necessary to account for significant differences in quality or other characteristics of the products across suppliers. Of course, homogeneity alone, does not cause a market to be conducive to collusion. As with each of the factors, homogeneity should be viewed in context with the other predisposing conditions to determine whether a market is conducive to collusion. As a result, it is not surprising to observe “intense competition” in markets with homogeneous products, as noted by B&W, when these markets do not have other predisposing conditions.

### 4. *Similar Costs*

56. Agreements among firms on price, tacit or otherwise, are more easily reached when the participating firms have similar costs. B&W do not dispute this premise. Rather, they contend that the evidence of cost similarity among major carriers is misleading due to the omission of “a variety of cost categories (such as collections and marketing) that may vary significantly across carriers.”<sup>69</sup> These other costs, however, are irrelevant. As discussed earlier in this appendix, they play no role and have no effect on the calculation of marginal costs

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<sup>67</sup> *Id.*, p. 48.

<sup>68</sup> See Posner, R. (1976), *ANTITRUST LAW: AN ECONOMIC PERSPECTIVE*, Chicago, IL: University of Chicago Press, pp. 59-60.

<sup>69</sup> Bernheim and Willig 1996 Manuscript, chapter two, p. 49.

across companies. Consequently, variances in these elements of overhead expenditures across carriers do not affect the carriers' pricing decisions and do not impair AT&T, MCI and Sprint's ability to reach a pricing agreement.

### **5. *Barriers to Entry***

57. An important condition conducive to collusion is the presence of barriers to entry, of which the most important is sunk costs. In the long distance markets an interexchange carrier's investments in its fiber-optic network are largely sunk – it cannot recoup those costs if it leaves a market or region of the country. AT&T, MCI, and Sprint have large investments in fiber-optic networks, and their sunk costs create a barrier to entry. These investments give the three large carriers significant advantages over any entirely new entrant and also over current small carriers. Any one of the existing networks could carry all of the nation's long-distance traffic at lower cost than any new entrant, so that incumbents could repel that entrant from the long-distance market business by signaling decreases in prices.<sup>70</sup> Indeed, since the divestiture of AT&T in 1984, no new facilities-based carrier has entered the long-distance market on a nationwide basis on the scale of Sprint, despite the fact that the size of the market has increased by more than 50 percent.<sup>71</sup>

58. B&W rely again on the role of resellers to address this point. They claim that I ignore "the ease with which other firms can enter the market . . . based on a failure to appreciate the competitive role of resellers. . . . He has completely missed the fact that resale allows potential competitors to grow organically, thereby reducing the need to incur sunk costs,

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<sup>70</sup> Paul W. MacAvoy, *THE FAILURE OF ANTITRUST AND REGULATION TO ESTABLISH COMPETITION IN LONG-DISTANCE TELEPHONE SERVICE*, Cambridge, MA., The MIT Press, (1996) at 96.

<sup>71</sup> *Id.*, p. 180.

as well as the fact that, through resale, retail services inherit the competitive characteristics of bulk wholesale services."<sup>72</sup> But resellers do not play a significant competitive role in the long-distance markets. This is because by growing organically, a reseller must make fixed cost investments for rights of way and installation of fiber-optic cable networks to become a facilities-based carrier. The barriers to entry affect resellers; all they add is a customer base not there for a completely new entrant. The fact that a reseller has an initial customer base in place does not shield it from these significant, sunk expenditures if it wishes to become a facilities-based carrier. Using capital invested in the customer base may or may not be a profitable investment to ease other costs of entry.

## **6. *Tariffing***

59. In October 1996, the FCC issued its Second Report and Order which eliminated tariff filing requirements for non-dominant interexchange carriers. Such abolishment of tariff filing requirements could be a necessary (but is clearly not a sufficient) condition for the breakdown of tacit collusion. Of course, one key aspect of the FCC's Second Report and Order is that carriers must make all their offerings readily accessible to the public. Thus the only significant change in the information available on one carrier's rates to other carriers is that the requirement for filing tariffs prior to their effective dates has been eliminated. It remains to be seen whether or not the FCC's decision will have an effect on competitiveness.

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<sup>72</sup> Bernheim and Willig 1996 Manuscript, chapter two, p. 49.



## APPENDIX B SENSITIVITY ANALYSIS

1. This appendix reviews price-cost margins calculated under mileage and time-of-day distributions that differ from the "Base Case" distribution discussed in Section V (see Table Five). The mileage and time-of-day distributions considered in this sensitivity analysis are shown in Appendix B Tables One and Two.

APPENDIX B-TABLE ONE  
MILEAGE DISTRIBUTION SCENARIOS

Mileage Distribution	Mileage0	Mileage1	Mileage2	Mileage3
0-292	0%	54%	20%	12%
293-430	1%	37%	20%	9%
431-925	8%	8%	20%	53%
926-1910	37%	1%	20%	24%
1911-3000	54%	0%	20%	2%

APPENDIX B-TABLE TWO  
TIME-OF-DAY DISTRIBUTION SCENARIOS

Time-of-Day Distribution	ToD0	ToD1	ToD2
Day	85%	40%	5%
Evening	10%	30%	10%
Night/Weekend	5%	30%	85%

As shown in Appendix B-Table One, Mileage3 is the base case distribution for a business customer (*i.e.*, WATS, 800, or Combined Services), Mileage0 shows a typical "East Coast" business customer mileage distribution while Mileage1 is the mirror image of the Mileage0 distribution, and Mileage2 is a uniform distribution. Similarly, time-of-day distribution ToD0 is the base case distribution for a business customer, ToD1 represents the time-of-day distribution of a typical residential customer, and ToD2 is the mirror image of the ToD0 distribution. Appendix B-Table Three shows the different scenarios that result from these



alternative distributions.

APPENDIX B-TABLE THREE  
CALLING PATTERN DISTRIBUTIONS

Scenario	MTS		WATS, 800, and Combined Services	
	Mileage	Time-of-Day	Mileage	Time-of-Day
Base Case	Mileage2	ToD1	Mileage3	ToD0
Scenario One	Mileage2	ToD0	Mileage0	ToD1
Scenario Two	Mileage2	ToD2	Mileage0	ToD2
Scenario Three	Mileage1	ToD1	Mileage1	ToD0
Scenario Four	Mileage1	ToD0	Mileage1	ToD1
Scenario Five	Mileage1	ToD2	Mileage1	ToD2
Scenario Six	Mileage0	ToD1	Mileage2	ToD0
Scenario Seven	Mileage0	ToD0	Mileage2	ToD1
Scenario Eight	Mileage0	ToD2	Mileage2	ToD2
Scenario Nine	Mileage3	ToD1	Mileage0	ToD0
Scenario Ten	Mileage3	ToD0	Mileage3	ToD1
Scenario Eleven	Mileage3	ToD2	Mileage3	ToD2

2. The results of the sensitivity analysis (see Appendix B-Figures One through Eighty-Six) confirm the findings reported in Section V. The main result of the sensitivity analysis is that price-cost margins have increased over time and tended to move in a “lock-step” fashion. As the figures illustrate, regardless of the particular mileage and time-of-day distributions, the same pattern of rising margins results.

3. In addition to reviewing these alternative mileage and time-of-day scenarios, I also examined increased usage levels for the switched, dedicated, and Combined Services using

Scenario Nine's mileage and time-of-day distributions. When usage was increased from 100 hours per month to 1,000 hours per month for switched services or increased from 1,000 hours per month to 5,000 hours per month for dedicated services, prices fell as expected. These lower prices led to lower levels of price-cost margins across all services (see Appendix B-Figures Eighty-Seven through Ninety-Three). However, despite the lower price-cost levels, the same pattern of rising margins over time obtains across all service categories.

4. In sum, after examining a wide range of alternative assumptions regarding mileage and time-of-day distributions, as well as usage levels, the fundamental result of my study remains: price-cost margins have increased over time and have done so in near "lock-step" fashion.

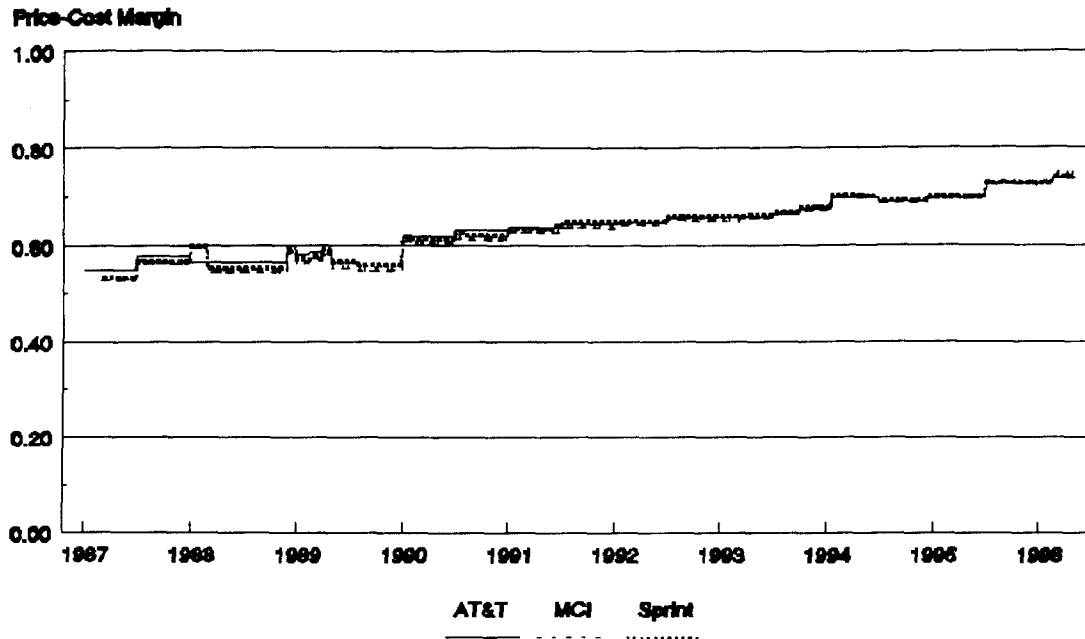
## SCENARIO ONE

### CALLING PATTERN DISTRIBUTION

Time-of-Day Distribution		
	MTS	WATS, 800 & Combined Services
Day	85 %	40 %
Evening	10 %	30 %
Night/Weekend	5 %	30 %

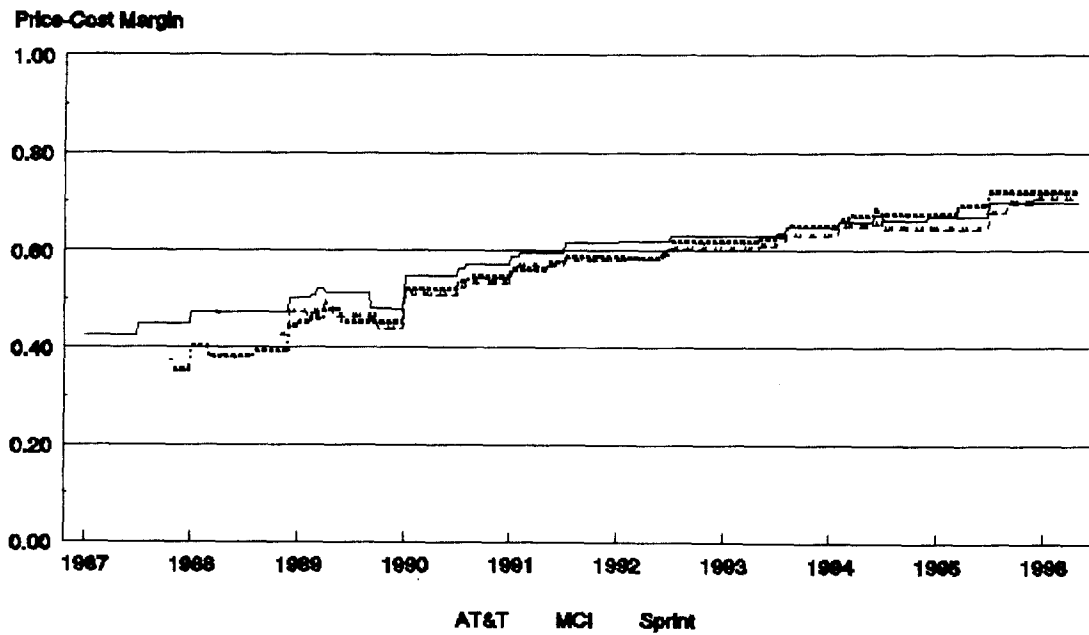
Mileage Distribution of Interstate Calls		
	MTS	WATS, 800 & Combined Services
0-292	20 %	0 %
293-430	20 %	1 %
431-925	20 %	8 %
926-1910	20 %	37 %
1911-3000	20 %	54 %

# APPENDIX B-FIGURE ONE PRICE-COST MARGINS FOR MTS



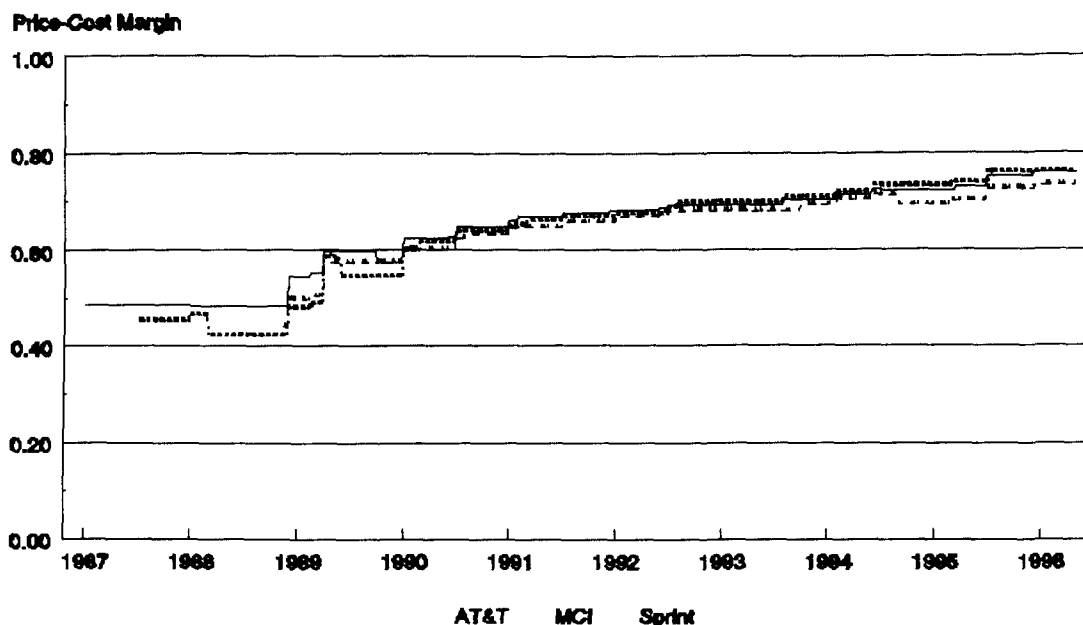
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

# APPENDIX B-FIGURE TWO PRICE-COST MARGINS FOR WATS SWITCHED OUTBOUND (100 HOURS PER MONTH)



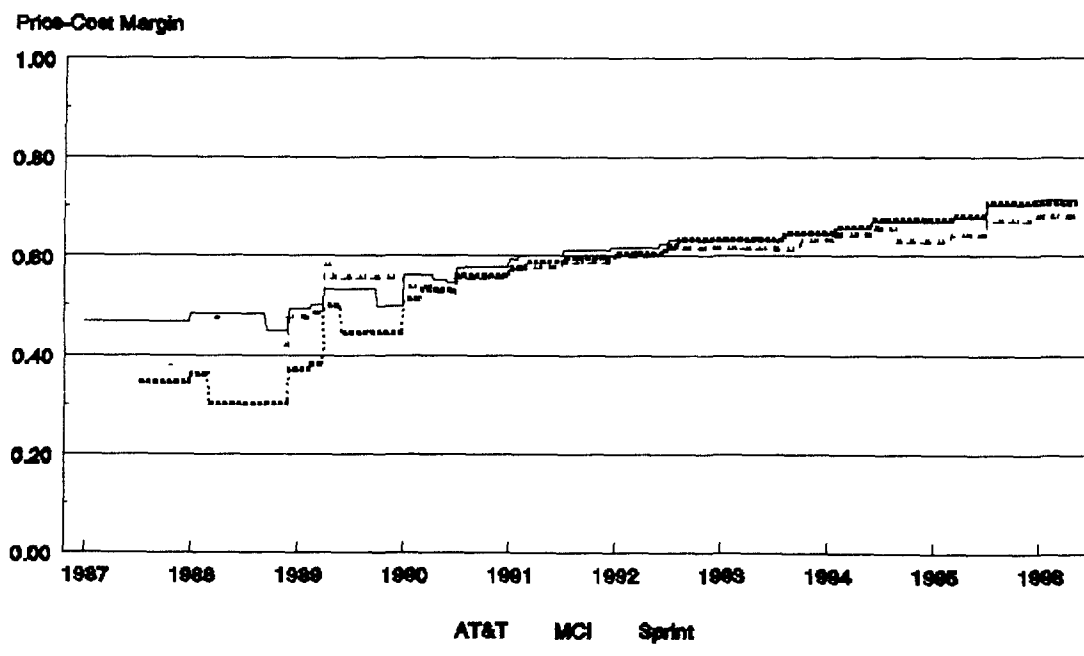
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE THREE  
PRICE-COST MARGINS FOR WATS DEDICATED OUTBOUND  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

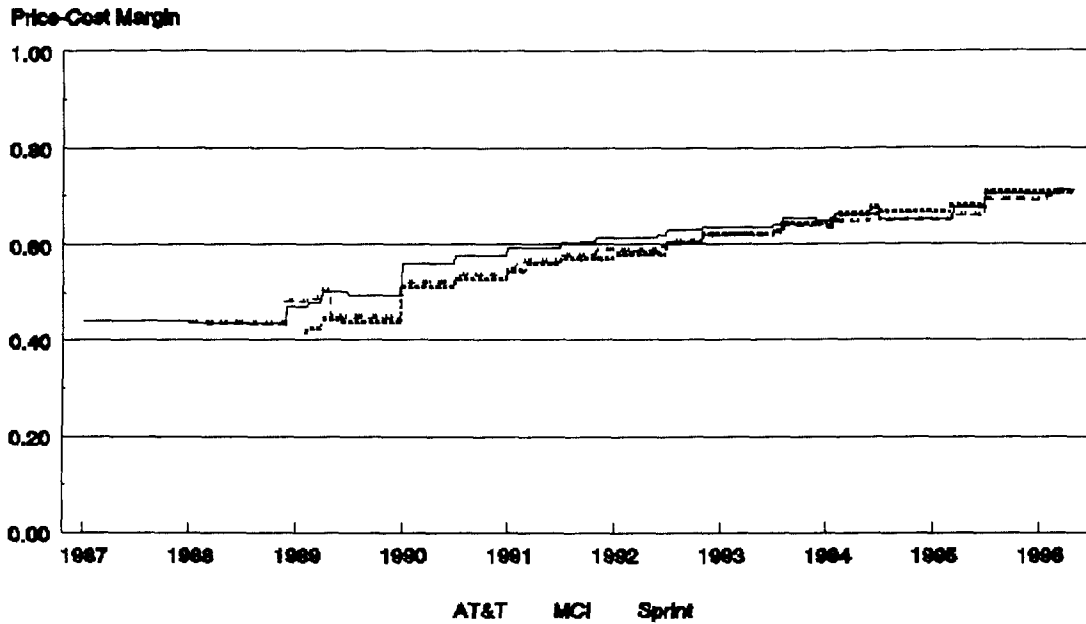
APPENDIX B-FIGURE FOUR  
PRICE-COST MARGINS FOR WATS DEDICATED OUTBOUND - 36 MONTH CONTRACT  
(1,000 HOURS PER MONTH)



Note: Sprint uses a 24 month contract.

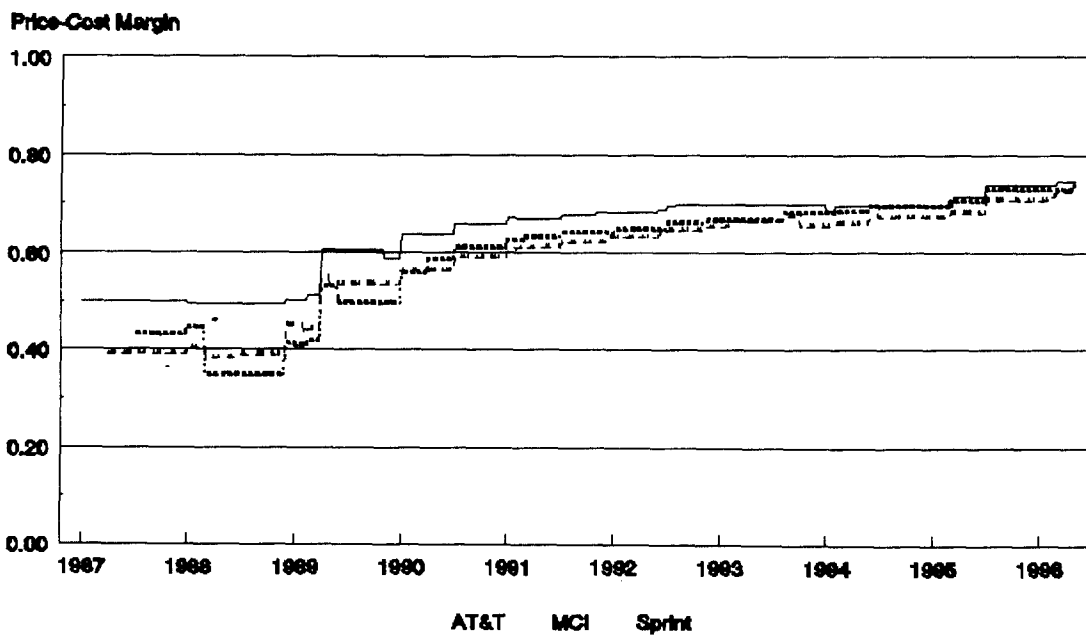
Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE FIVE  
PRICE-COST MARGINS FOR WATS SWITCHED INBOUND  
(100 HOURS PER MONTH)



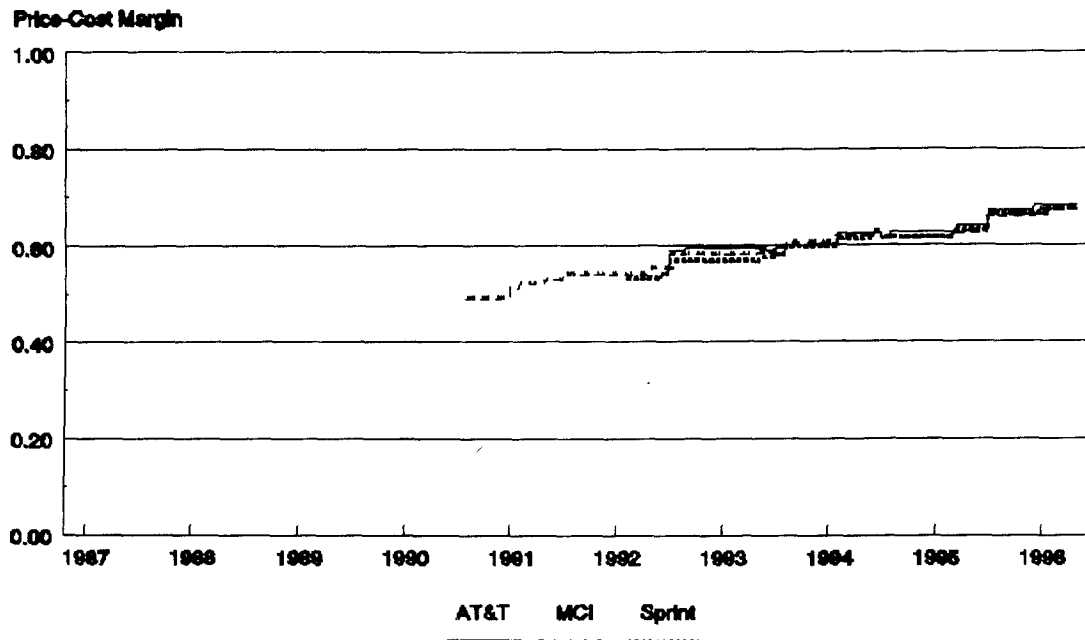
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE SIX  
PRICE-COST MARGINS FOR WATS DEDICATED INBOUND  
(1,000 HOURS PER MONTH)



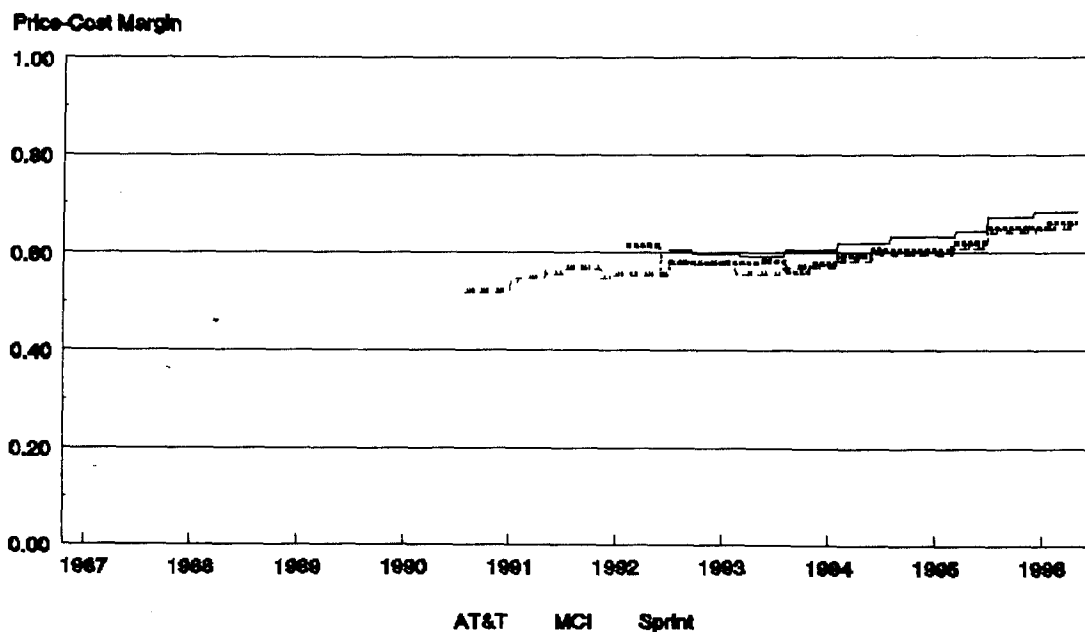
Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE SEVEN  
PRICE-COST MARGINS FOR COMBINED SWITCHED SERVICE  
(100 HOURS PER MONTH)



Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE EIGHT  
PRICE-COST MARGINS FOR COMBINED DEDICATED SERVICE  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

## SCENARIO TWO

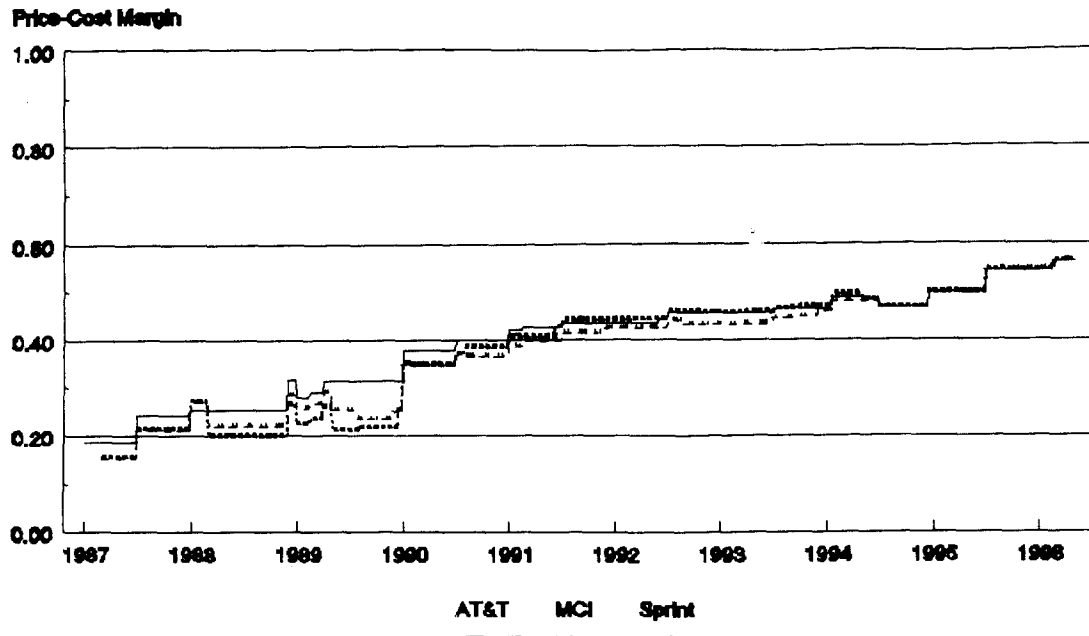
### CALLING PATTERN DISTRIBUTION

Time-of-Day Distribution		
	MTS	WATS, 800 & Combined Services
Day	5 %	5 %
Evening	10 %	10 %
Night/Weekend	85 %	85 %

Mileage Distribution of Interstate Calls		
	MTS	WATS, 800 & Combined Services
0-292	20 %	0 %
293-430	20 %	1 %
431-925	20 %	8 %
926-1910	20 %	37 %
1911-3000	20 %	54 %

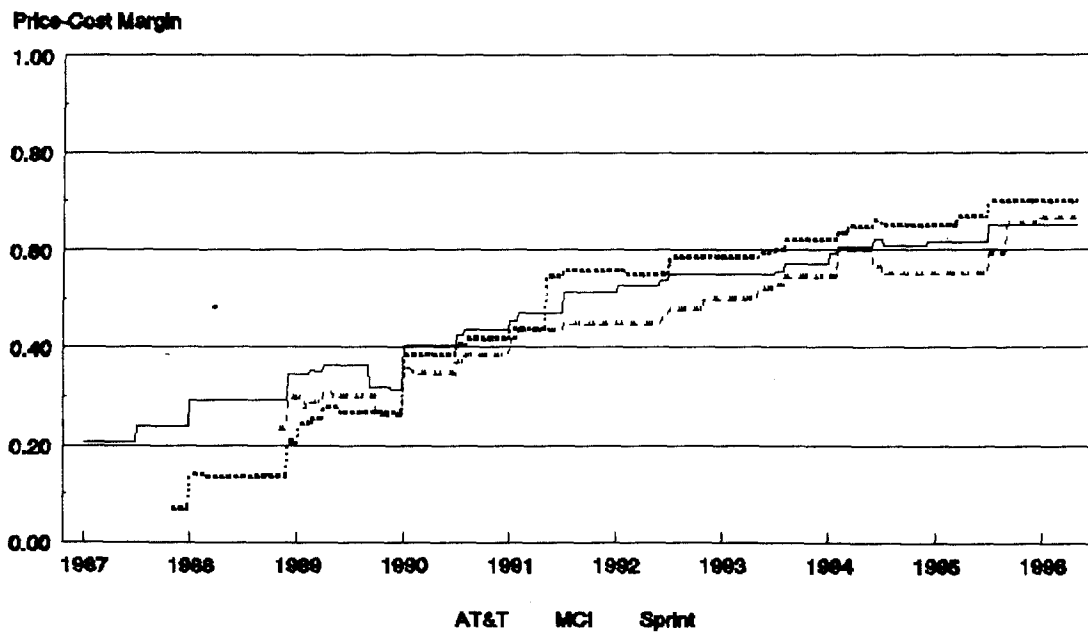


APPENDIX B-FIGURE NINE  
PRICE-COST MARGINS FOR MTS



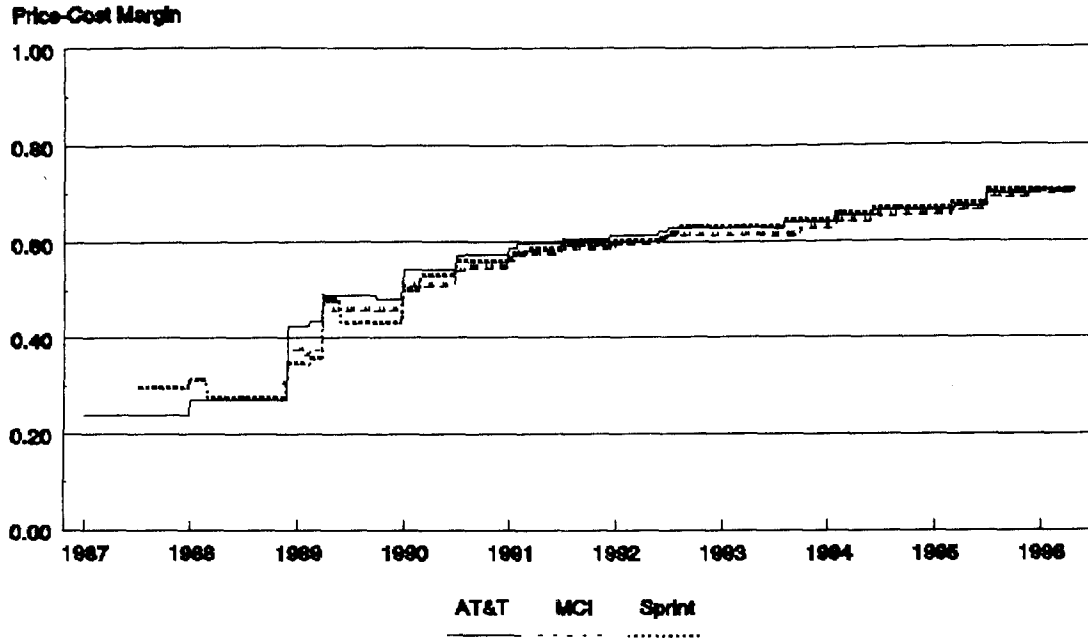
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE TEN  
PRICE-COST MARGINS FOR WATS SWITCHED OUTBOUND  
(100 HOURS PER MONTH)



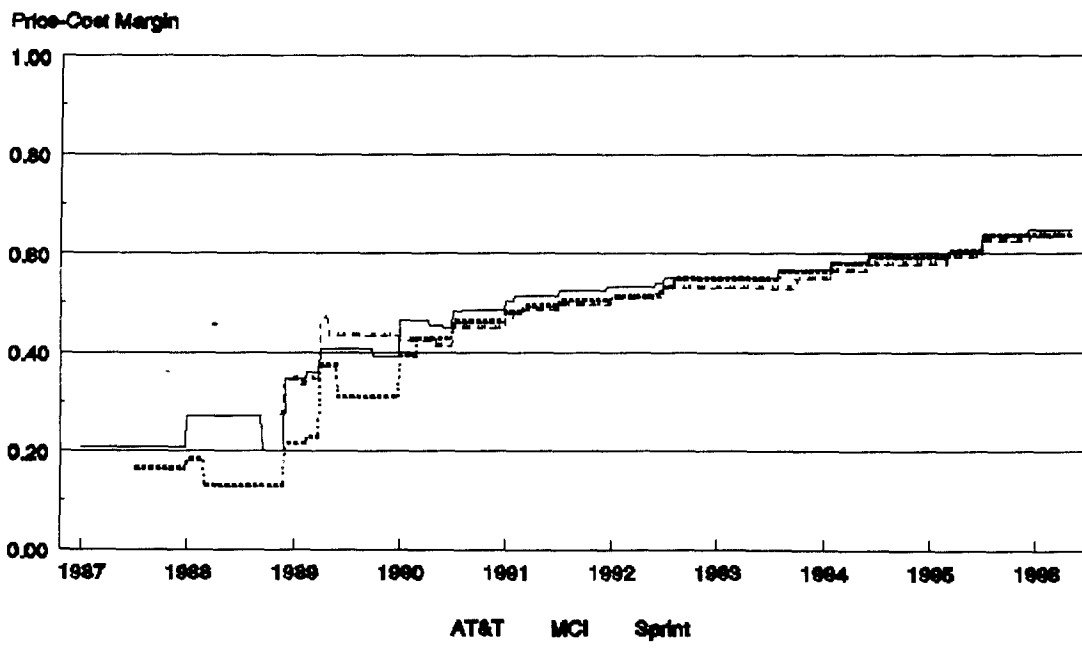
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE ELEVEN  
PRICE-COST MARGINS FOR WATS DEDICATED OUTBOUND  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

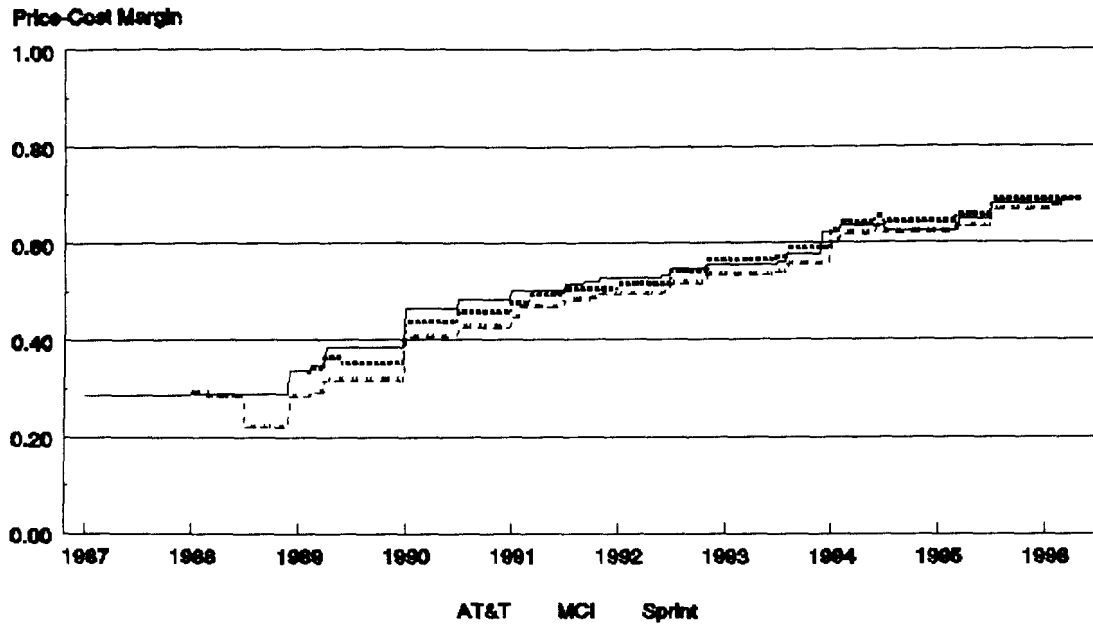
APPENDIX B-FIGURE TWELVE  
PRICE-COST MARGINS FOR WATS DEDICATED OUTBOUND - 36 MONTH CONTRACT  
(1,000 HOURS PER MONTH)



Note: Sprint uses a 24 month contract.

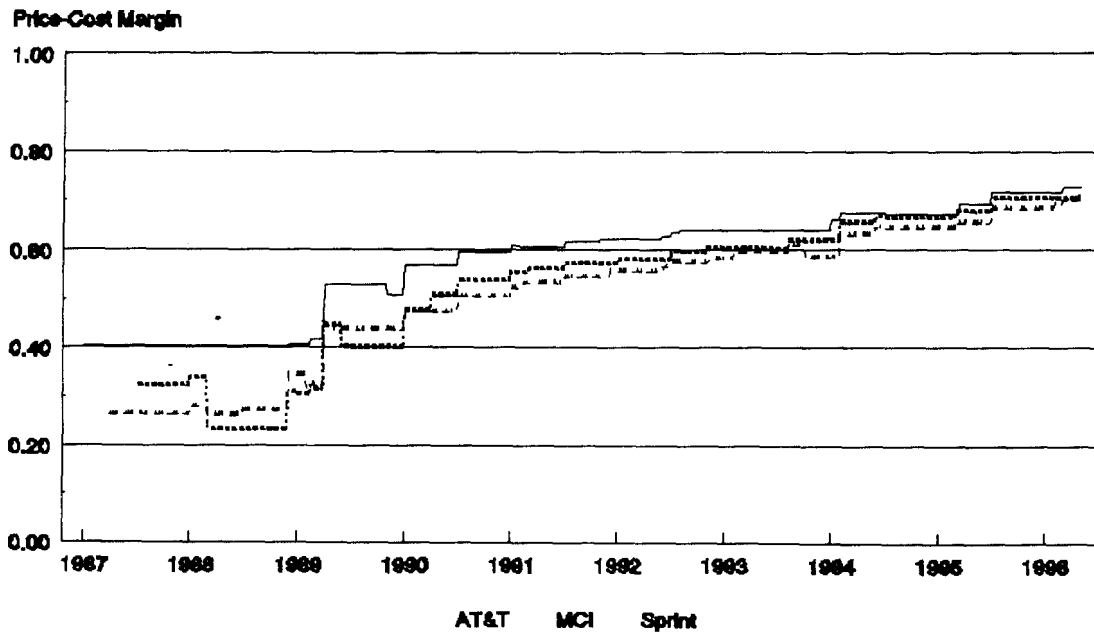
Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE THIRTEEN  
PRICE-COST MARGINS FOR WATS SWITCHED INBOUND  
(100 HOURS PER MONTH)



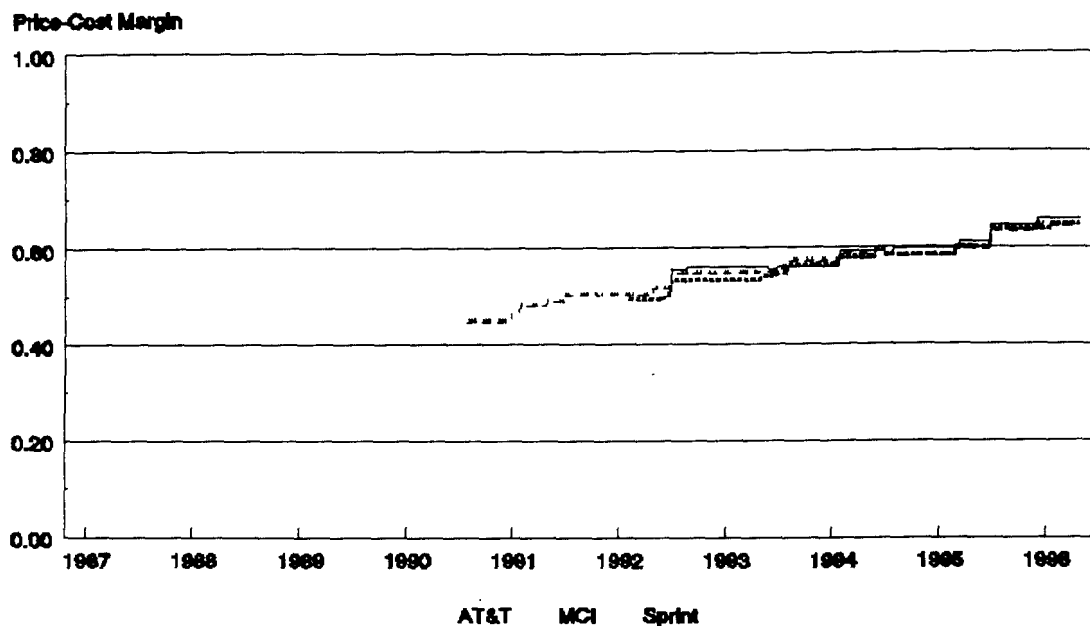
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE FOURTEEN  
PRICE-COST MARGINS FOR WATS DEDICATED INBOUND  
(1,000 HOURS PER MONTH)



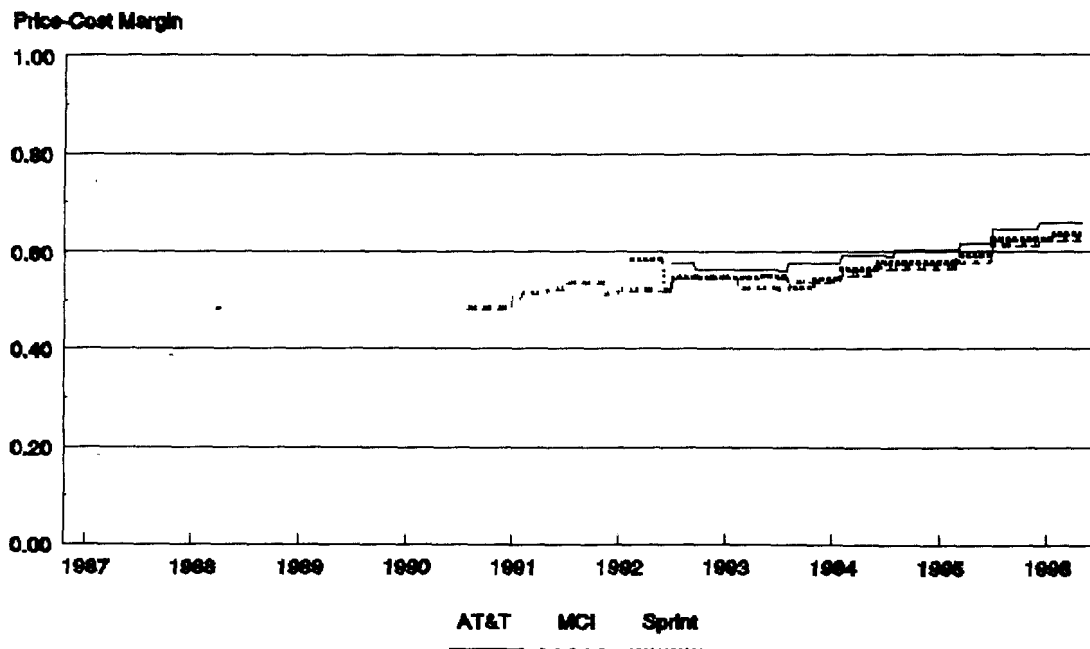
Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE FIFTEEN  
PRICE-COST MARGINS FOR COMBINED SWITCHED SERVICE  
(100 HOURS PER MONTH)



Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE SIXTEEN  
PRICE-COST MARGINS FOR COMBINED DEDICATED SERVICE  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

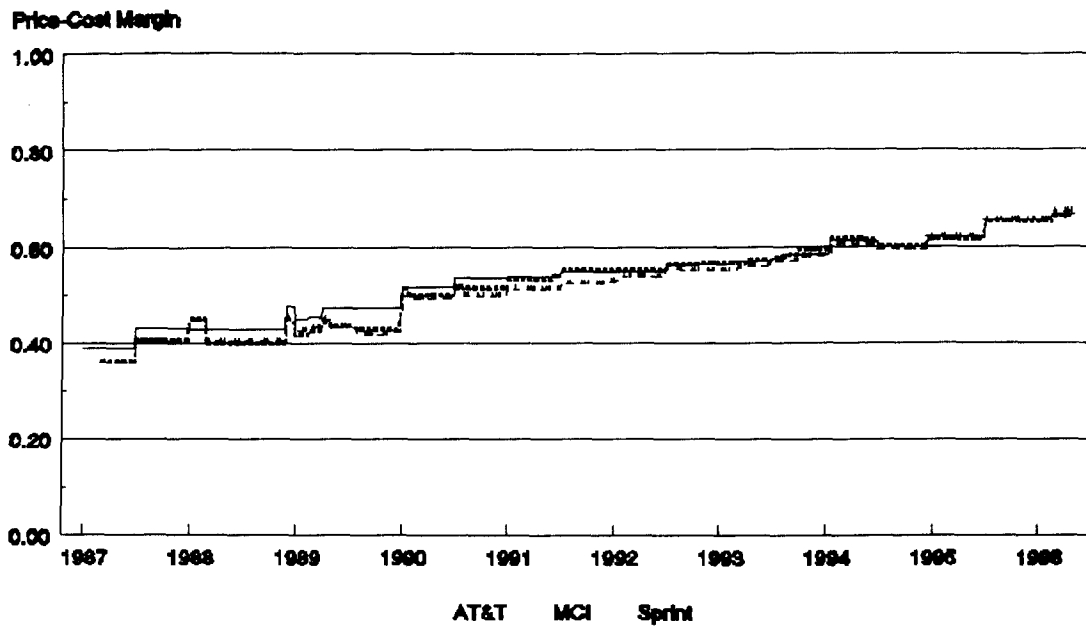
## SCENARIO THREE

### CALLING PATTERN DISTRIBUTION

Time-of-Day Distribution		
	MTS	WATS, 800 & Combined Services
Day	40 %	85 %
Evening	30 %	10 %
Night/Weekend	30 %	5 %

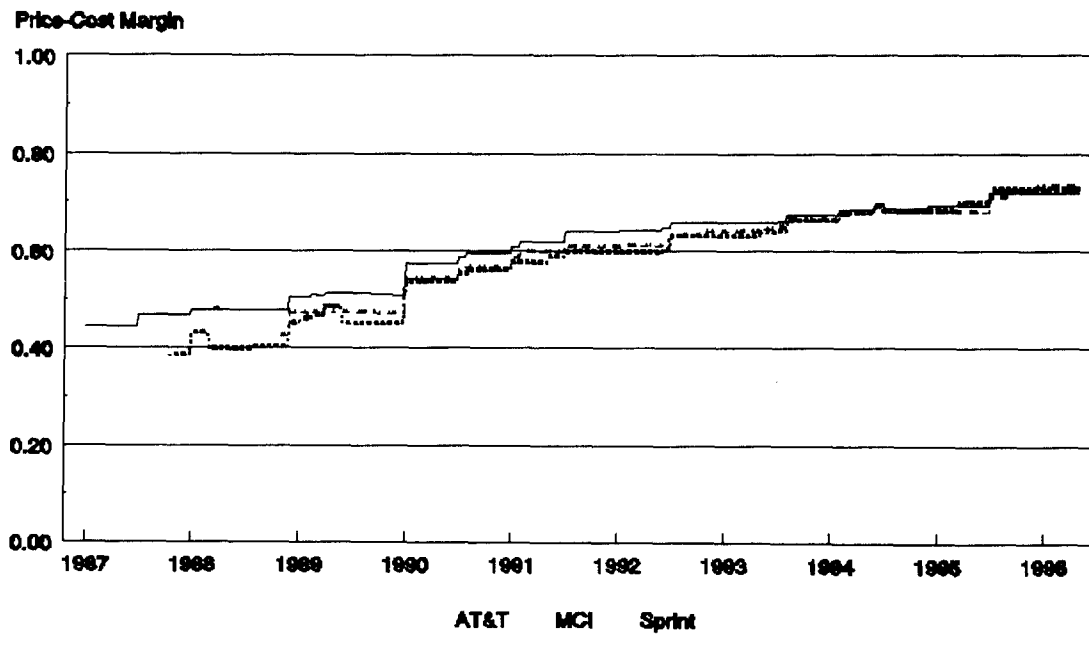
Mileage Distribution of Interstate Calls		
	MTS	WATS, 800 & Combined Services
0-292	54 %	54 %
293-430	37 %	37 %
431-925	8 %	8 %
926-1910	1 %	1 %
1911-3000	0 %	0 %

APPENDIX B-FIGURE SEVENTEEN  
PRICE-COST MARGINS FOR MTS



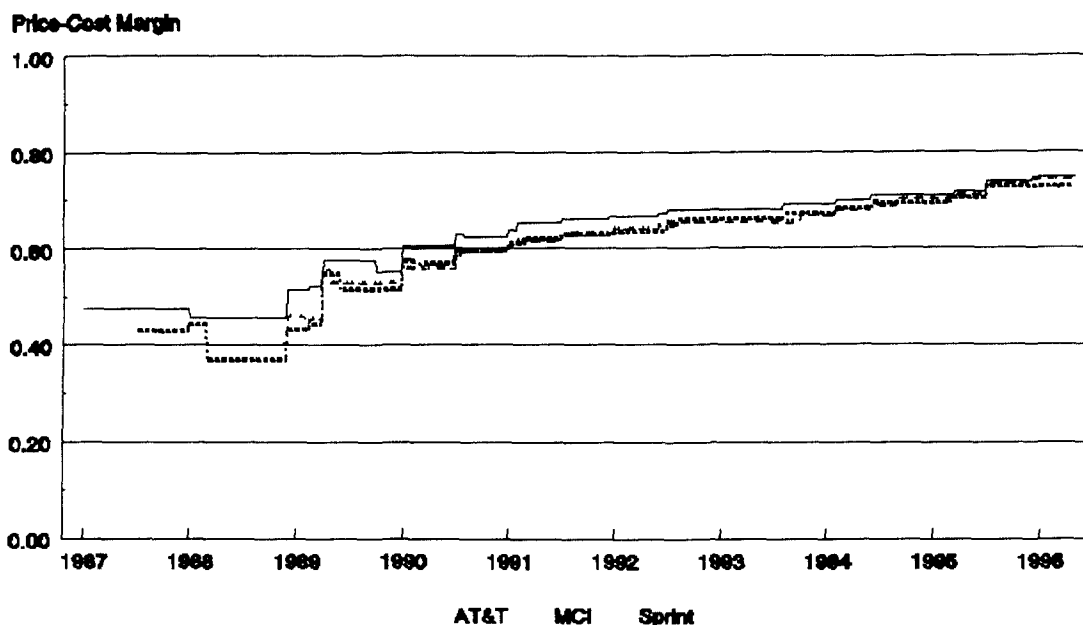
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE EIGHTEEN  
PRICE-COST MARGINS FOR WATS SWITCHED OUTBOUND  
(100 HOURS PER MONTH)



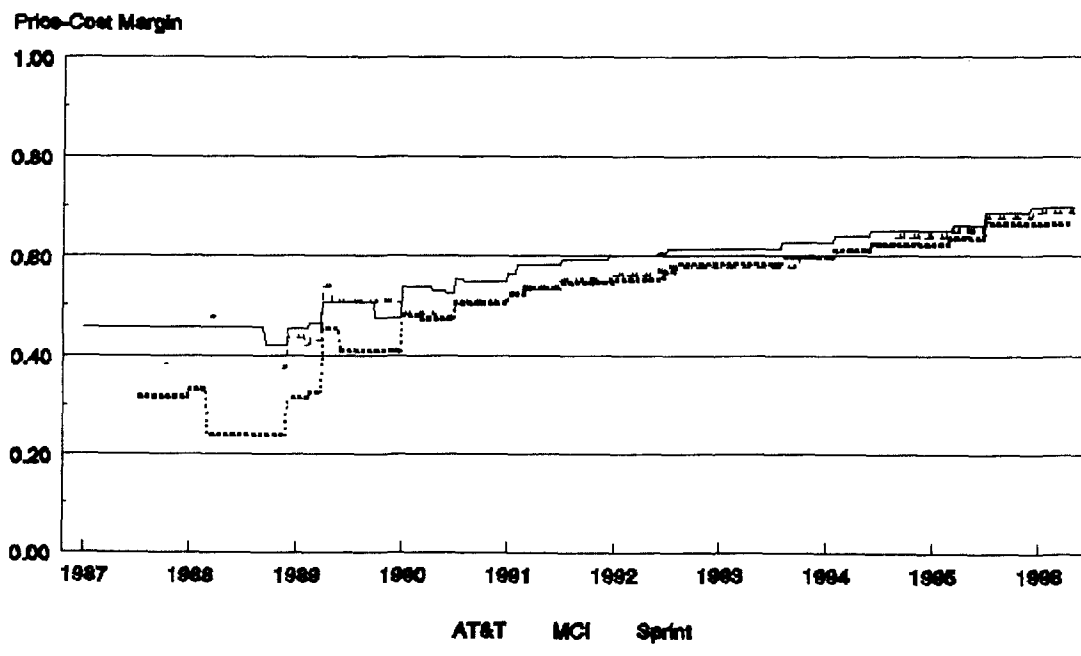
Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE NINETEEN  
PRICE-COST MARGINS FOR WATS DEDICATED OUTBOUND  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

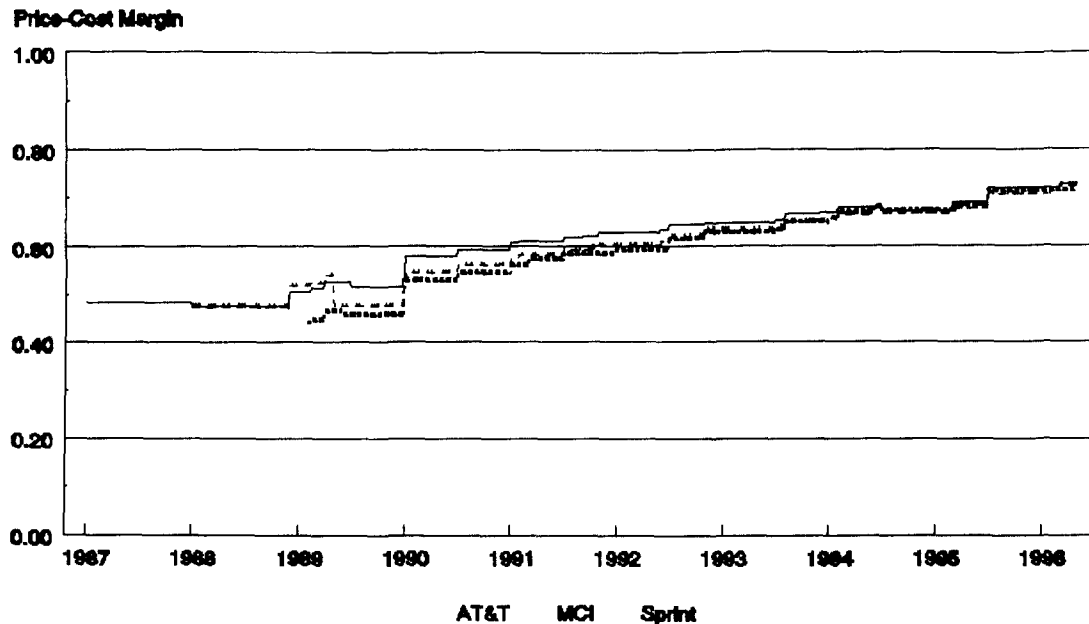
APPENDIX B-FIGURE TWENTY  
PRICE-COST MARGINS FOR WATS DEDICATED OUTBOUND - 36 MONTH CONTRACT  
(1,000 HOURS PER MONTH)



Note: Sprint uses a 24 month contract.

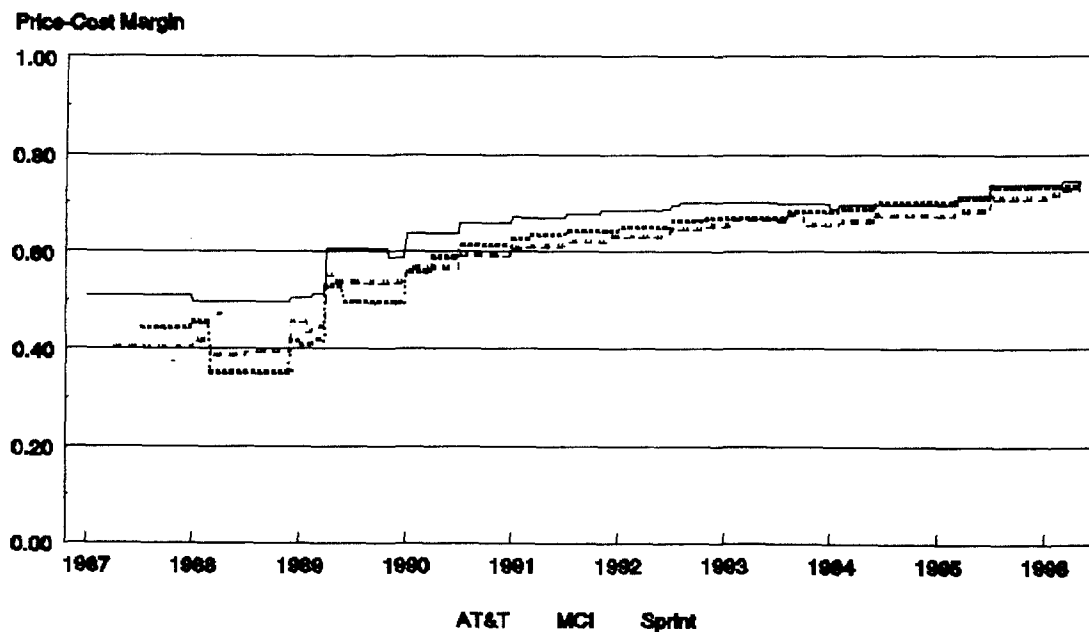
Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE TWENTY-ONE  
PRICE-COST MARGINS FOR WATS SWITCHED INBOUND  
(100 HOURS PER MONTH)



Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

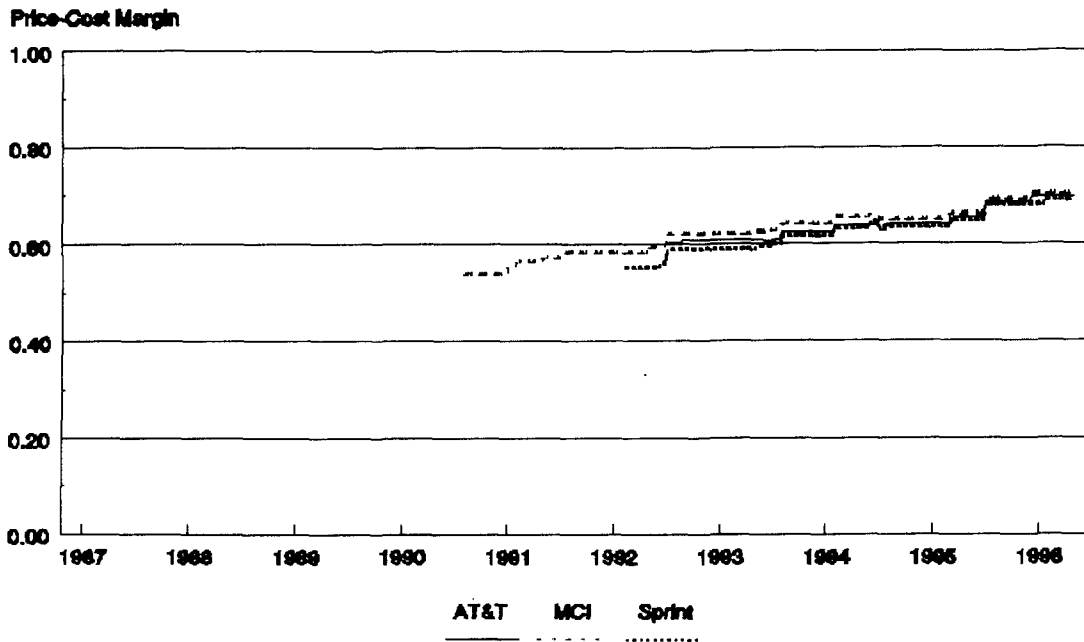
APPENDIX B-FIGURE TWENTY-TWO  
PRICE-COST MARGINS FOR WATS DEDICATED INBOUND  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.

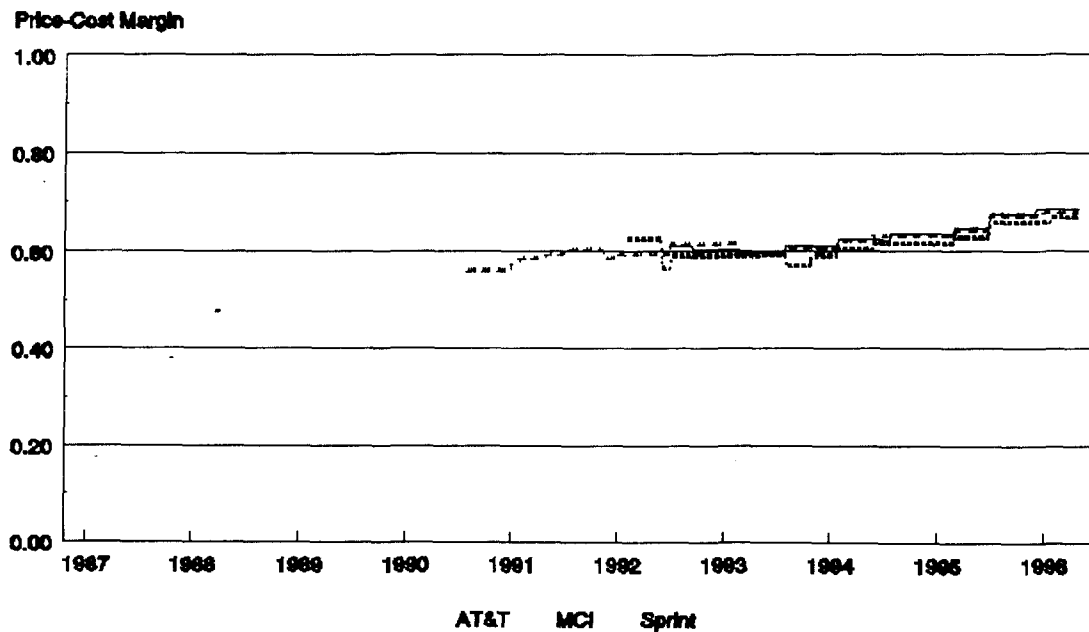


APPENDIX B-FIGURE TWENTY-THREE  
PRICE-COST MARGINS FOR COMBINED SWITCHED SERVICE  
(100 HOURS PER MONTH)



Sources: Marginal costs from FCC; and rates from HTL Telemanagement, Ltd.

APPENDIX B-FIGURE TWENTY-FOUR  
PRICE-COST MARGINS FOR COMBINED DEDICATED SERVICE  
(1,000 HOURS PER MONTH)



Sources: Marginal costs from FCC and Pacific Bell; and rates from HTL Telemanagement, Ltd.